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SEEC: Student Enrollment and Engagement through Connections (SEEC)

The Student Enrollment and Engagement through Connections (SEEC) is a five year project funded by the National Science Foundation's STEM Talent Expansion Program (STEP). The goal of the SEEC project is to increase the number of engineering graduates at Iowa State University by approximately 100 per year. In addition, the percentage of women and minority graduates will approach 20% and 10%, respectively. The project is a collaborative partnership between Iowa State University (ISU) and Des Moines Area Community College (DMACC). Project objectives are designed within the areas of learning communities, curriculum, advising, networking, and evaluation. Activities are planned in each of these areas using a logic model approach that identifies resources, outputs, outcomes, and impact.

The project is grounded in established and emerging practices in retention and recruitment. The key retention practice is learning communities combined with student-centered advising. The key recruitment practice is messaging, based on findings from the national study on "Changing the Conversation" [1] and social networking theory. The objectives of the project are intended to: increase the retention of students in engineering at Iowa State through learning communities and advising; increase the number of students at DMACC who are interested and prepared to enter an engineering program through learning communities, advising, and curriculum; increase the number of transfers from DMACC to ISU in engineering, and overall, to improve transfer recruitment and retention in engineering; and improve and expand the messaging, awareness, and understanding of engineering to positively influence students to choose an engineering program of study through ISU or DMACC. To summarize the SEEC Project, this paper will be divided into distinct sections in order to provide highlights from each of the objective teams. Each objective Team mirrors that of the SEEC Executive Team, and members include both DMACC and ISU stakeholders: staff, faculty, and students.

Learning Village

The learning village objective team is designed to increase engagement and retention rates of community college pre-engineering, community college transfer, and first year students entering Iowa State's College of Engineering through multiple points of engagement. All ISU engineering departments now have learning communities, and transfer student learning community options are expanding. DMACC has identified pre-engineering student cohorts and created a four-semester learning community. Through a new peer mentor program, there is enhanced peer mentor relationship building with pre-engineering students. Peer mentors are actively involved with transfer student activities and events. Partnerships have developed with various transfer recruitment activities, including the NSF S-STEM project, academic departments, the Program for Women in Science and Engineering, and the Office of Community College Research and Policy.

The Learning Village Team has customized the ISU's Admissions Partnership Program (APP) with Iowa community colleges to support prospective transfer students in engineering, called E-APP. Students have access to services before transferring to ISU. An electronic professional network, hosted by transfer peer mentors and used by pre-engineering community college students across the state, has been created to facilitate early interactions. Community college students are assigned an academic advisor to facilitate transfer planning and are invited to attend the fall and spring engineering career fairs at ISU, providing opportunities for career exploration and meetings with faculty, staff, students, and employers.

Advising

The Advising Objective Team has focused on improving advising programming for transfer students through professional development, resource development, and new advising initiatives. Advisors at ISU and in community colleges require continuous updates regarding the advising strategies and resources that lead to transfer student success. Faculty and advisor training occurs one-on-one, in groups on site and through events on campus. Additionally the advising objective team is charged with collecting, disaggregating, and disseminating data to inform our recruitment

and retention programming. This is done through quarterly data/information briefs that can be used to inform administrators, faculty, staff, and students regarding the student experience, retention rates, transcript stories, and strategies for student success. Advising strategies which lead to increased retention of transfer and first year students are also part of the work of the Advising Objective Team. This includes transfer learning communities, transfer peer mentors, at-risk advising strategies, and tutoring. The work of the advising objective team assumes that effective advising approaches lead to increased student success and graduation rates.

Engineering advising has used various early intervention strategies, and through project activities, has shared and enhanced information and practices. In concert with university Student Affairs, the college is piloting the use of Map-Works, an online tool to get feedback from and inform first-year students, aimed at improving student success, retention, development, and involvement. During fall 2009, both first-year/first-time students and transfer students in engineering participated in MapWorks.

Networking

The Networking Objective Team, partnering with ISU Extension has been expanded to impact recruiting throughout the state. The ETEC (Engineering Talent in Every County) initiative combines a scholarship program with a new information kit to provide Extension youth professionals with resources and training. The result is network building, technology for professional development, and a train-the-trainer model for information dissemination. In addition, in collaboration with Extension and ISU's GIS (Geographic Information Systems) Center, the project has initiated a new web-based, interactive database as a state-wide resource for engineering career exploration.

Over the past year, the college's recruiting materials have been redesigned to incorporate the new messaging [2]. The theme – that engineers create a better world and that students can (*Be Creative*)² – was developed with ZLRIGNITION, a communications marketing firm that has experience with Iowa State and youth marketing.

Curriculum

The Curriculum Objective Team has focused on redesigning the first year (FY) engineering curriculum to enable flexibility and commonality across the learning communities and to make selected engineering gateway courses available to DMACC students via distance education. The primary activity associated with this team includes a comprehensive review of the first year curriculum including core courses, service learning, undergraduate research, diversity programming, community college pre-engineering, and 2nd and 3rd year courses offered through distance education. The strategies involved in this team's work are intended to increase student engagement in meaningful engineering curricula and related experiences resulting in increased retention rates and thus of increased graduation rates.

The curriculum team is working in concert with an NSF S-STEM project on curriculum and programming to achieve first-year and later student development outcomes aligned with national studies, such as the Engineer of 2020 [3, 4]. Course modules are being piloted by a group of faculty leaders from several engineering departments in collaboration with faculty and staff involved with learning communities and assessment in the college. This work complements the new messaging promoted through other project activities, because the promise of engineering to create a better world is not only a message but an expectation for learning.

Evaluation

The evaluation team is intended to evaluate project effectiveness and improve project activities. The evaluators apply quantitative and qualitative evaluation methods (both formative and summative) to improve project activities. Several instruments and processes have been developed through the various objective team activities. The evaluation team has facilitated and managed the development and implementation of a logic model planning and evaluation system. Each objective team is guided by their individual logic model plan that is revised each year to reflect new and ongoing activities. The evaluation team also directs the formation of a dashboard of metrics developed in collaboration with DMACC to gauge project success and inform project activities.

Collaboration

The project is a collaboration between ISU and DMACC, and the objectives and successes of the project are shared across both institutions. Our collaboration is, in itself, a success of the project. It has elevated our joint effort to create a DMACC-ISU transfer pathway for students into engineering, and is also improving each institution's transfer programs and services. At ISU, it is helping us build a more extensive and effective transfer enterprise in engineering. DMACC has been successful in its own right, and has significantly advanced its engineering-related programs and services as a result of the project. DMACC has identified, developed and implemented a comprehensive communication plan that familiarizes high school students, parents, faculty, and staff with career opportunities and educational pathways in engineering. Advisors at each high school in DMACC's district advise students about engineering opportunities and careers. Likewise, a communication plan has been implemented for enrolled college students to gain familiarity with opportunities at DMACC and transfer institutions in the field of engineering. Materials were created specific to each audience. We also provided training through staff development activities, involving staff and faculty from both institutions, to allow them to more effectively transition students into this career path. DMACC has used input from business and industry regarding recruiting of non-traditional students into engineering. Career symposiums specifically for women and minority students have been offered. Through the project, we have created additional capacity for students to learn about, pursue, and persist in engineering.

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- [4] S. Sheppard, K. Macatangay, A. Colby, and W. Sullivan, *Educating Engineers: Designing for the Future of the Field*, San Francisco: Jossey-Bass, 2008.

